ENCEPHALITIS FIELD SURVEILLANCE IN ORLEANS PARISH

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Orleans Parish has a diverse topography which includes woods, swamps, and marshlands. These habitats of the Parish support 44 of the 52 species of mosquitoes which occur in the State (Johnson, 1959). With the presence of vector mosquitoes and an abundant bird population, the Parish appears ideal for arboviruses to thrive. The responsibility for detection and prevention of an encephalitis epidemic has been assumed by the City Department of Health, Division of Mosquito Control. The Mosquito Control Division in cooperation with the Louisiana State Board of Health, developed an encephalitis surveillance program based on recommendations of the U.S.P.H.S., National Communicable Disease Center. A three-phase program was initiated for the detection of virus activity, including sampling of mosquitoes, and the examination of sentinel and wild bird bloods. All collections were made by mosquito control personnel and samples were processed by the State Board of Health.

Due to the extensive urbanized areas of the Parish, the primary virus under surveillance was St. Louis encephalitis (SLE). Eastern and western equine encephalitis, in order of importance, were likewise under surveillance during the program.

The first phase of the program consisted of sampling of suspected mosquito vectors. During the surveillance period only four suspected species, *Culex quinquefasciatus, C. salinarius, Aedes sollicitans,* and to a lesser degree *A. vexans,* occurred in numbers sufficient to sample. All materials used for collecting mosquitoes were kept in containers having tight fitting lids and stored in areas free of insecticide to avoid contamination. CDC light traps with dry ice were operated in six areas, twice a week every other week from March through August. Newly emerged broods were not sampled until sufficient time had elapsed for the mosquitoes to obtain blood meals. Manual and mechanical aspirators were used to collect *C. quinquefasciatus*

in resting areas associated with known breeding sites. All mosquitoes were identified to species and grouped into pools ranging in number from 50, in the case of *C. quinquefasciatus,* to 200 individuals of *Aedes* species. Virus isolations were attempted by cerebral injection into suckling mice. *C. salinarius* pools were limited to 100 mosquitoes because of their toxic effect on mice, (Chamberlain, 1967). A total of 145 pools were submitted to the laboratories for testing.

The second phase of the program was the sampling of sentinel chicken bloods. After being reared in a mosquito-free environment, the 3-week-old chicks were screened for presence of encephalitis antibodies prior to their selection as sentinel birds. Four sentinel chicken flocks comprised of ten birds each were positioned throughout the Parish to help determine virus activity location. Each bird was banded prior to screening to maintain individual records throughout the program. The flocks were bled at 2-week intervals from March through September. The brachial vein proved best for removal of the 0.5 cc. blood samples. Alcohol swabs were used to avoid possible bacterial contamination, but seemed to inhibit blood clotting and were therefore discontinued. Hemagglutination inhibition (HI) tests were employed for the detection of virus antibodies. Positive HI findings were confirmed by retesting.

In the third and largest phase of the program, 27 locations in the Parish were used for collecting wild bird bloods. Birds were sampled for 1 week during each month, and for 3 weeks in June, from March through November. No blood samples were taken in October. The birds were taken by use of mist nets, Havahart sparrow traps, baited walk-in traps, shotguns, and by hand in the case of nestlings. All birds were released unharmed, except for 23 specimens of waterfowl taken by shotgun during hunting seasons.

Net and trap areas were prebaited with cracked corn for several days prior to each trapping week. It was realized that sites not prebaited had considerably less bird activity. Prebaiting probably accounted for the success in capturing sufficient numbers of birds for sampling. Best net collections per unit effort were obtained at sites where trees and bushes were 10 to 20 feet in height.

House sparrows and pigeons, important hosts of SLE, were preferred species. These two species accounted for 70 percent of the 1,517 birds bled throughout the surveillance period. These birds were banded in the hope of obtaining conversion information on recaptures. Birds were aged and sexed in light that immature birds might expose recent virus activity.

In the order Passeriformes, the perching birds, blood samples were taken from the jugular vein; in other orders extraction was made from the brachial vein. In the case of birds taken by shotgun, the blood was removed from the brain via the foramen magnum or by direct heart punctures.

Since active viremia is present in birds for only a short time and an isolation rate of only 2 percent is to be expected in epidemic areas (Lord, 1967), no virus isolations were attempted on bird bloods.

RESULTS. No virus isolations were obtained from the 145 mosquito pools submitted. Three of the 40 sentinel chickens showed positive titers of 1:20 for WEE. Since these were low titers and did not reappear in subsequent samples, it was presumed that the positives may have been caused by non-specific inhibitors. Table 1 shows all positive wild birds, total birds bled per month, and percent positive to each virus per month. Results indicated that one bird had antibodies to both eastern and western equine encephalitis. This may be a valid record; however, since both EEE and WEE are members of Group A viruses, the results could indicate a cross reaction with only the higher titer representing the true virus (Lord, 1968).

The results of all three phases of the

TABLE 1.—Bird species having positive HI titers to SLE, EEE, and WEE.

Month	Species	* Sex/age **	Virus and Titer SLE	EEE	WEE	Total birds	% Positive SLE	EEE	WEE
March	Blue jay	U/M		1:20		101		1.0	
April	House sparrow	F/I		1:80		214		2.8	.5
	House sparrow	F/I		1:20					
	House sparrow	F/I		1:40					
	Cowbird	F/I		1:20					
	House sparrow	U/I		1>40					
	Cowbird	F/M		1>80	1:20				
May	House sparrow	F/I		1:20		201	.5	.75	
	House sparrow	F/M		1:20					
	House sparrow	U/M	1:40						
	House sparrow	U/I		1:40					
June	House sparrow	M/I		1:40		596		.33	.16
	Blue jay	U/I		1:20					
	Blue jay	U/M			1:20				

* U=Undetermined
F=Female
M=Male.
** I=Immature
M=Mature.

surveillance program indicated very little, if any, virus activity in the Parish during 1967; however, during the latter part of June unconfirmed results were received on 159 specimens of sentinel and wild bird bloods. The results showed that 42 percent of the samples were positive for SLE with the majority from the Audubon Park Zoo area. Even though these were presumptive HI positives, subject to confirmation, more surveillance personnel were sent to the Park immediately to collect additional blood samples, which were forwarded to N.C.D.C. Seven pools of *C. quinquefasciatus* were collected from the Park and forwarded to the State Laboratories for attempted virus isolations. Intense mosquito control activities were conducted in conjunction with the surveillance. During daylight hours ground larviciding personnel treated all breeding areas and at dark fog trucks were deployed to the area. Within a few days mosquito counts were reduced sharply, and no more *C. quinquefasciatus* could be located. When verification results were returned from N.C.D.C., it was concluded that the initial test results were "false positives."

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